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Moral disengagement, locus of control, and belief in a just world: Individual differences relate to adherence to COVID-19 guidelines

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ABSTRACT

We examined relationships between moral disengagement, locus of control, and just world beliefs and adherence to COVID-19 containment measures. We predicted that these individual differences would be more influential for adherence than beliefs about the pandemic (e.g., its origins and one's perceived susceptibility to infection). COVID-19-related measures of these three individual differences were each significantly associated with adherence even after controlling for demographics and pandemic beliefs although beliefs about the severity of the virus and the benefits of containment measures also significantly related to adherence. Beliefs were associated with the individual difference measures and political orientation. Moral disengagement, the strongest individual difference predictor, was associated with lower support for each pandemic containment precaution (e.g., mask wearing). These results can be used to frame messages to increase adherence to public health measures.

1. Introduction

The COVID-19 pandemic created disruption around the globe, from societal-level problems like economic downturns and unemployment to individual problems like suicide and substance abuse (Bao et al., 2020). To reduce the spread of the coronavirus, the Centers for Disease Control and Prevention recommends practices such as social distancing and wearing a mask (2020). However, compliance with these containment guidelines has varied, with 14% of U.S. respondents reporting they never wear a mask when outdoors, with differences by age and gender (Gallup Organization, 2020). Given the importance of these containment measures for protecting public health, it is important to identify factors influencing adherence.

Researchers have identified how beliefs about the pandemic influence the decision to wear masks or follow other virus containment measures. People in Poland who viewed the pandemic more negatively and as characterized by civic duty were more likely to comply with restrictions (Zajenkowski et al., 2020). Other studies have investigated associations between demographic factors and adherence. Women report wearing masks more often than men (Gallup Organization, 2020). Younger adults and White people were less likely to say they have regularly worn masks, and more people who were Democrat-leaning than Republican-leaning followed mask guidelines all or most of the time in the past month (76% vs. 53%; Pew Research, 2020).

Beyond these differences, there has been little research on whether other predictors of behavior established in social psychological research affect adherence to COVID-19 containment measures. For example, adherence might be related to individual differences in perceptions of how much control one has over life events (Rotter, 1954), whether people can justify their reasons for not following public health measures (Bandura, 2016), or believe that people will get what they deserve regardless of precaution measures (Lerner & Miller, 1978). In this study, we used an online survey to investigate whether three individual difference variables (moral disengagement, locus of control, and just world beliefs) are associated with beliefs about the pandemic and influence adherence to containment measures. In examining these variables, we draw from moral reasoning and its relationships to behavior (Haidt, 2001). Thus, all three individual difference variables have the common connections of 1) moral reasoning and 2) preserving one's sense of justice. That is, cognitions and behavior (such as mask wearing) can be shaped by moral reasonings and sense of justice. There have been many theoretical frameworks of moral decision-making (Garrigan et al., 2018), some of which focus on social cognitions (e.g., dual process frameworks). However, unlike our study, few have focused specifically on individual differences, and when they did, it was a small part of their model (see Haidt, 2001).

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1.1. Moral disengagement

Moral disengagement (MD) is a cognitive process in which a person reframes moral actions and ethical standards as not applying to oneself (Bandura, 2016). Moral disengagement can occur in some situations and not others because people choose when they activate self-regulatory standards (Bandura, 2002). This means that some people are more likely than others to morally disengage in various situations. Thus, the propensity to moral disengagement is often treated as an individual difference, whereas the act of moral disengagement is treated as a state or process that results from an interaction between behavior, cognition, and environmental factors (Bandura, 2002).

In addition to MD's positive relationship with unethical (Detert et al., 2008) and anti-social (Shu et al., 2011) behavior, MD is also related to individual differences that relate to political leaning - which predicts willingness to adhere to COVID-19 policies (Pew Research, 2020). Specifically, people with a higher propensity to morally disengage are more likely to hold just world beliefs (discussed next), legal authoritarian, and social dominance beliefs (Kirshenbaum et al., 2020). Because conservatives generally tend to hold these beliefs (Hiel & Mervielde, 2002) and are less likely than Democrats to adhere to COVID-19 guidelines (Pew Research, 2020), it is likely that MD similarly relates to COVID-19 guideline adherence.

1.2. Just world beliefs

Belief in a just world refers to a person's view that the world is orderly and predictable; people "get what they deserve" (Lerner & Miller, 1978). People believe in a just world to prevent feeling vulnerable (Fox et al., 2010) and, by blaming victims of the negative event (Vonderhaar & Carmody, 2014), just world beliefs (JWB) help them believe they can prevent personally experiencing the negative event. Thus, people might be more likely to protect themselves by wearing facemasks and social distancing to 1) reduce vulnerability and 2) avoid perceived blame from others who would believe they deserved to become ill because they did not take precautions.

1.3. Locus of control

Locus of control (LOC) is the belief that the outcomes in one's life are controlled by either internal or external forces (Rotter, 1954). Having a high internal LOC is related to believing one is able to make behavioral changes—as compared to a high external LOC or believing that sources outside the self are in control (Wallston et al., 1978). People might be more likely to comply with COVID protocols if they have high internal LOC and thus feel empowered to control their pandemic outcomes. Alternately, they might believe that fate will determine whether they contract the virus (external LOC). A study conducted during the COVID-19 pandemic found that people with higher external LOC report more symptoms of depression (Sigurvinsdottir et al., 2020); however, researchers did not measure adherence to COVID precautions.

2. Overview and hypotheses

As discussed above, these individual differences are rooted in justice and morality. In addition, the theories' constructs are linked. MD's displacement of responsibility is similar to having an external LOC. LOC and BJW, and the attribution component of MD, are each about ascribing blame in a morally acceptable way. These individual differences are also related in past research. For example, Furnham (2003) found that "the single individual difference variable that [BJW] seemed most closely correlated with was internal locus of control" (p. 797). Although there is no study specifically linking MD, LOC, and JWB, and adherence to COVID-19 containment measures, there are studies on topics related to covid containment measures (i.e., moral and helping behavior). For example, BJW and MD work together to predict helping propensity in emergencies (Li et al., 2018); LOC and MD jointly predict moral judgement (Bhattacharyya & Ray, 2017); BJW and LOC predicted helping behavior after witnessing an accident (Bierhoff et al., 1991). Our research aim is to examine their links to COVID-19 containment measures.

In this study we expect that these theoretically derived and well supported social-psychological measures will relate to adhering to virus containment measures. Further, these individual differences will matter more than other associations between adherence and demographics and pandemic beliefs established during the pandemic. Thus, we hypothesize that 1) higher levels of JWB and LOC will be associated with more adherence and that higher amounts of MD will be associated with lower adherence, even after controlling for demographic factors and pandemic beliefs. Our second hypothesis is that 2) political orientation and these individual differences will be associated with particular pandemic beliefs.

3. Method

3.1. Participants

We excluded 41 participants from our initial sample ($N = 463$) who responded that they either had tested positive for COVID or were unsure. For comparisons, Table 2 presents the sample demographics for a) our initial sample, b) the sample after removing the COVID cases, and c) the sample used in the regression analysis.

3.2. Measures and methods

Our outcome measure, adhering to containment behaviors, was developed for this study and contained five questions, including "I will wear a mask in public" ($\alpha = 0.87$). Otherwise, we adapted validated scales to fit the COVID-19 pandemic (Table 1). All scales used a 5-point Likert response scale from strongly disagree to strongly agree with a neutral option.

The COVID-19 MD scale items were based on Bandura's (2002) original eight MD mechanisms ($\alpha = 0.89$). Six items were adapted from Dalbert's (1999) BJW scale ($\alpha = 0.85$). COVID-19 LOC was adapted from Wallston et al.'s (1978) multidimensional health LOC scale with higher scores indicate higher internal LOC ($\alpha = 0.78$).

Eight items measured pandemic beliefs about prevention, conspiracy, and origins of COVID. Four questions were based on the Health Belief Model's constructs of perceived disease severity, susceptibility to contracting it, and benefits or barriers to engaging in containment behaviors (Skinner et al., 2015). Demographics measured included age, race/ethnicity, gender, and political affiliation from very liberal (1) to very conservative (7).

The data were collected using Amazon Mechanical Turk (Mturk) - a crowdsourcing Internet marketplace that monetarily compensates community members for participating in studies. Mturk is frequently used for online data collection and the workers' characteristics approximate the American electorate (Levay et al., 2016). Eligible participants were age 18 and older and lived in the U.S. They were paid a small sum for their participation. Informed consent was obtained, and the study was approved by the university IRB.

4. Results

To examine whether pandemic beliefs were associated with adherence, we conducted Pearson Product-Moment correlations (Table 3). All correlations were significant and ranged from small (−0.11) to strong (0.62) with most in the moderate range (from 0.30 to 0.60). The largest correlation with adherence measures was agreeing that taking steps to reduce threats of COVID-19 is beneficial.

Table 1
COVID-19 items for adherence to containment measures, moral disengagement, just world beliefs, and locus of control.

Measures	Question
Adherence	I will take precautions to prevent contracting COVID-19.
	I will wash my hands frequently to protect myself from COVID-19.
	I will social distance (i.e., keep 6 ft away from other people).
	I will wear a mask in public.
	I will stay home unless I need to leave the house for essential reasons.
	I will take precautions to prevent contracting COVID-19.
Moral disengagement	It is better to help the working people than to protect people who are retired and no longer contributing to the economy.
	COVID-19 is just another name for the flu.
	It is ok to risk a larger spread of COVID-19 if it means the economy can be saved.
	Most people who contract COVID-19 recover, just like the yearly seasonal flu.
	It is not my job to stay home and prevent the spread of the virus; the government has resources to protect public health.
	Reopening businesses and risking the spread of COVID-19 is not as bad as leaving people unemployed.
	People who contract COVID-19 are partially at fault because everyone knows the risks of contracting the virus before they choose to leave their house.
	Businesses should start to reopen because several authorities (e.g., governors) think that they should reopen.
Just world beliefs	During the pandemic, I believe that, by and large, people get what they deserve.
	Regarding the pandemic, I am confident that justice will prevail over injustice.
	I think people try to act fairly when making important decisions about COVID-19.
	Regarding the pandemic, I am treated fairly.
	Overall, events in my life during the pandemic are just.
	I believe that most of the things that happen in my life during the pandemic are fair.
Locus of control	If I get COVID-19, I am to blame.
	I am in control of whether I get COVID-19.
	If I get COVID-19, it is my own behavior which determines how soon I get well again.
	The main thing which affects whether I get COVID-19 is what I myself do.
	If I take the right actions, I can avoid contracting COVID-19.
	If I take care of myself, I can avoid COVID-19.

Table 2
Study participant demographics.

	Initial sample (N = 463)		Sample without COVID-positive cases (*n* = 422)		Regression sample (n = 359)	
	N	%	N	%	N	%
Female	179	38.7	159	37.7	142	39.6
Male	280	60.5	260	61.6	217	60.4
Missing gender	4	0.9	3	0.7	0	0.0
African American	50	10.8	47	11.1	39	10.9
White	336	72.6	308	73.0	265	73.8
Asian	37	8.0	35	8.3	27	7.5
Native American	16	3.5	14	3.3	11	3.1
Latinx	23	5.0	17	4.0	16	4.5
Other race/ ethnicity	1	0.2	1	0.2	1	0.3
Democrat	201	43.4	184	43.6	156	43.5
Republican	156	33.7	139	32.9	115	32.0
Independent	71	15.3	68	16.1	60	16.7
No affiliation/ other	34	7.3	30	7.1	28	7.8
Missing affiliation	1	0.2	1	0.2	0	0.0
Contracted COVID[a]	41	8.9	0	0.0	0	0.0
Mean age (SD)	38.70	(12.21)	38.86	(12.15)	38.84	(12.19)

[a] Includes respondents who answered "yes" or "not sure".

Table 3
Pandemic beliefs correlations with adherence to public health guidelines.

Pandemic belief	Adherence
COVID-19 is severe	0.58**
Susceptible to contracting COVID-19	0.18**
Taking steps to reduce threats of COVID-19 is beneficial	0.62**
Difficult to prevent myself from contracting COVID-19	−0.11*
More important to protect the public health than the economy	0.46**
Pandemic was planned by people in power	−0.32**
COVID-19 pandemic response was more extreme than was necessary	−0.37**
Virus originated in animals and was not man-made	0.20**

* $p < .05$.
** $p < .01$.

4.1. Individual differences associations with adherence

To test our hypothesis that individual difference variables are associated with adherence after controlling for pandemic beliefs and demographics, we conducted hierarchical multiple regression analyses. In step 1, the demographic variables gender (male/female), age, race/ethnicity (White/nonWhite) and political orientation were entered in the model. In step 2, pandemic beliefs were added. We used the three pandemic belief questions that had the strongest correlations with adherence (r's > 0.40): "COVID-19 is severe", "Taking steps to reduce threats of COVID-19 is beneficial", and "More important to protect the public health than the economy." In step 3, the final step, we entered the individual difference variables (JWB, MD, and LOC). Three cases with standardized residuals greater than 3.3 were examined as potential outliers. There were no significant changes to the regression model when re-run without the three cases, so they were retained. All other regression assumptions were met.

Two of the pandemic beliefs, and all individual difference variables were significant in the final model (Adj. $R^2 = 0.52$; $F(10, 348) = 39.94$, $p < .001$; Table 4) thus confirming our first hypothesis. In the first step, older age and being more liberal were both significantly associated with adherence. However, these demographics became nonsignificant when pandemic beliefs were entered in step 2, suggesting that personal beliefs are more important than demographics. In step 2, two of the pandemic belief questions were significant ("COVID-19 is severe" and "Taking steps to reduce threats of COVID-19 is beneficial"), but there was not an association between adherence and the belief that it is "More important to protect the public health than the economy."

In step 3, when the three individual difference variables (MD, JWB, LOC) were entered, each was significantly associated with adherence. The two belief questions remained significant. No demographic variables were significant. MD was the strongest individual difference predictor, as identified by the squared semipartial correlation ($sr^2 = 0.02$).

4.2. Pandemic beliefs' associations with individual differences and political orientation

We used Pearson Product-Moment correlations to examine our hypothesis whether political orientation and individual differences were associated with particular pandemic beliefs (Table 5). Supporting our hypothesis, there were significant correlations between MD, LOC, and JWB and the pandemic belief questions except one's perceived susceptibility to contracting the virus. The strongest associations were between MD and a) believing the pandemic was planned by the government ($r = 0.60$) and b) believing the response to the pandemic was too extreme ($r = 0.73$). Political orientation was associated with each pandemic belief except for the question whether it was difficult to prevent oneself from contracting COVID-19 also confirming our hypothesis.

We followed this analysis with a linear regression model (Table 6) using the eight pandemic beliefs questions as explanatory variables for

Table 4
Hierarchical regression of adherence to COVID precautions on demographics, pandemic beliefs and individual differences, $n = 359$.

Variable	Model 1			Model 2			Model 3		
	b (*SE*)	β	sr^2	*b* (*SE*)	β	sr^2	*b* (*SE*)	β	sr^2
Demographics									
Gender (female)	0.54 (0.41)	0.07	0.004	0.31 (0.30)	0.04	0.001	0.20 (0.30)	0.03	0.001
Race/ethnicity (nonWhite)	0.58 (0.46)	0.07	0.004	−0.02 (0.34)	−0.01	0.000	−0.05 (0.33)	−0.01	0.000
Age	0.06 (0.02)**	0.18	0.030	0.01 (0.01)	0.04	0.002	0.02 (0.01)	0.06	0.003
Political orientation	−0.45 (0.10)***	−0.23	0.051	−0.12 (0.08)	−0.06	0.003	−0.10 (0.09)	−0.05	0.002
Pandemic beliefs									
COVID is severe				1.25 (0.18)***	0.34	0.066	1.21 (0.18)***	0.33	0.062
Taking steps is beneficial				1.57 (0.19)***	0.38	0.094	1.25 (0.20)***	0.31	0.051
More important to protect public health				0.24 (0.17)	0.07	0.003	0.03 (0.17)	0.01	0.000
Individual differences									
Just world belief							0.07 (0.03)*	0.09	0.005
Moral disengagement							−0.09 (0.03)**	−0.18	0.016
Locus of control							0.09 (0.04)*	0.10	0.007
Constant	20.91 (0.81)			9.04 (0.93)			9.83 (1.3)		
Adjusted R^2	0.087			0.501			0.521		
F for change in R^2	9.50***			98.97***			5.89**		

Note. Parentheses indicate value = 1 for dummy coded variables.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 5
Pandemic beliefs correlations with moral disengagement, just world beliefs, locus of control and political orientation.

Pandemic belief	Moral disengagement	Just world belief	Locus of control	Political orientation
1. Severe	0.361**	0.098	0.084	−0.167**
2. Susceptible	−0.051	−0.075	−0.082	−0.104*
3. Beneficial	−0.450**	0.122*	0.147**	−0.240**
4. Difficult	0.295**	0.018	−0.154**	0.074
5. Important	−0.424**	0.093	0.163**	−0.339**
6. Planned	0.603**	0.140**	0.196**	0.257**
7. Extreme response	0.732**	0.182**	0.162**	0.399**
8. Originated in animals	−0.196**	0.025	0.035	−0.283**

* $p < .05$.
** $p < .01$.

Table 6
Multiple regression of moral disengagement on pandemic beliefs, $n = 394$.

Belief	*b* (*SE*)	95% CI
COVID-19 is severe.	−0.74 (0.30)*	[−1.32, −0.15]
I am susceptible to contracting COVID-19.	0.22 (0.23)	[−0.24, 0.68]
Taking steps to reduce threats of COVID-19 is beneficial.	−0.45 (0.32)	[−1.07, 0.17]
It is difficult to prevent myself from contracting COVID-19.	0.77 (0.24)**	[0.30, 1.24]
It is more important to protect the public health than the economy.	−1.07 (0.27)***	[−1.61, −0.54]
The pandemic was planned by people in power.	1.67 (0.24)***	[1.21, 2.13]
The COVID-19 pandemic response was more extreme than was necessary	2.55 (0.23)***	[2.10, 3.00]
The virus originated in animals and was not man-made.	0.53 (0.21)*	[0.12, 0.93]
Constant	14.16 (1.73)***	[10.76, 17.56]
Adjusted R^2	0.65	

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 7
Individual adherence measures' correlations with moral disengagement.

Measure	Moral disengagement
I will take precautions to prevent contracting COVID-19.	−0.38*
I will wash my hands frequently to protect myself from COVID-19.	−0.30*
I will social distance (i.e., keep 6 ft away from other people).	−0.42*
I will wear a mask in public.	−0.27*
I will stay home unless I need to leave the house for essential reasons.	−0.39*

* $p < .01$.

the MD scale, which our results showed was the strongest individual difference. All questions, except feeling susceptible to the virus and thinking adherence is beneficial, were significantly associated with MD ($F(8, 386) = 90.87$ $p < .001$, adj. $R^2 = 0.65$). Believing the response to be too extreme had the largest squared semi-partial coefficient with MD ($sr^2 = 0.11$).

Finally, in examining which behavioral adherence guidelines were associated with MD, Pearson correlations showed that MD was negatively correlated with each adherence measure (Table 7).

5. Discussion

Our study examined whether individual differences related to adherence to COVID-19 containment measures after controlling for demographics and pandemic beliefs. As hypothesized, all individual difference variables (belief in a just world, locus of control, and moral disengagement) were associated with adherence, even after controlling for demographics and pandemic beliefs, although one's beliefs about the pandemic remain important for influencing adherence. We also found that political orientation, MD, BJW, and LOC were associated with an individual's beliefs about the pandemic.

5.1. Individual differences

Of the three individual difference variables, MD had the strongest association with (non)adherence. MD provides justification for why people do not need to follow the rules and individual interests are more important than society's (Shu et al., 2011). The pandemic belief that "the pandemic response was extreme" had the strongest association with MD.

Further, other beliefs contributed to MD including not believing in the severity of the virus, believing it is difficult to prevent getting infected, thinking the pandemic was planned by people in power, and believing it is more important to protect the economy than public health. Our finding that MD is associated with each adherence behavior measured extends previous research during the COVID-19 pandemic, which had shown a relationship between MD and social distancing (Alessandri et al., 2020).

Higher beliefs in a just world were also associated with more adherence. In other words, it appears that the more an individual believes the world is fair and that people get what they deserve, the more likely they are to follow the public health guidelines. This finding supports previous research demonstrating that for events that are controllable, people with high JWB will take action to reaffirm their belief in a fair world in which there are consequences for actions (Furnham, 2003). The COVID-19 guidelines (i.e., mask wearing, social distancing) are relatively easy behaviors within one's control. By engaging in these adherence behaviors, it might reaffirm that people who contract COVID deserved it. Having an internal LOC was also associated with adherence. Our findings specific to the pandemic support a long line of research showing that LOC is associated with people's greater engagement in actions that promote and protect health, especially for people who value health (Weiss & Larsen, 1990). As discussed, research has consistently shown how the above variables influence behavior in other situations. Our study demonstrates that these factors also operate to influence behavior during a pandemic. Finally, we have also shown that these individual differences are important in moral behavior which is an underdeveloped aspect in models of moral behavior.

5.2. Pandemic beliefs, demographics, and adherence

Results show how impactful a person's interpretation of the situation is in influencing containment behavior – MD, in particular. The two significant pandemic beliefs associated with adherence after the individual difference variables were entered in the model were the Health Belief Model constructs of perceived benefits of taking action, and perceived severity of COVID-19. Beliefs about susceptibility to contracting COVID were not as strongly associated with adherence, nor were they associated with MD. However, only 39% of participants agreed that they were susceptible to COVID, which might be why that construct did not have as large an impact in this study.

As in previous studies, we found age related to adherence. This was only partial supported, as it appears that pandemic beliefs and MD, JWB, and LOC are more closely associated with adherence. That is, our results show that both pandemic beliefs and the measures of individual differences (MD, JWB and LOC) are important for adherence. Even after controlling for one's beliefs about the pandemic's severity and the benefits in taking steps to reduce the spread, these individual differences were significant in predicting adherence. In other words, both one's beliefs about the pandemic and these established social psychological individual differences matter in following virus containment measures. Political orientation was not associated with adherence when measured with the other factors in this study. Perhaps individual differences (e.g., JWB) that characterize political orientation influence adherence rather than political orientation itself. In this way, the results of the current study help explain these previous demographic findings.

5.3. COVID-19 measures

Our study extends research on JWB, LOC, and MD to the COVID-19 pandemic by adapting questions to this specific situation. Our scales demonstrated good reliability and could be used by researchers studying this and similar pandemics but should be validated with other samples. Using these COVID-19-specific measures might explain why we found stronger associations between MD and containment measures than other studies which did not use pandemic-specific questions (e.g., Alessandri et al., 2020). Our measures also demonstrate the wide utility of these individual differences as they proved applicable in this specific situation.

5.4. Implications and future directions

Our results have implications for public health message development. First, JWB often leads to negative consequences such as victim blaming (e.g., of rape). However, in the context of a pandemic, messages targeting JWB could prove useful because high JWB encourages adherence to COVID protocols. Threats to JWB (e.g., a pandemic) can lead to derogation, blame, or helping (Haynes & Olson, 2006). Giving people the chance to help might prevent derogation and blame. In order to get people to help (rather than derogate or blame), the potential victim has to be seen as likeable and having low responsibility for the outcome (Haynes & Olson, 2006). Messages crafted for people to specifically "help your elderly grandmother who has pre-existing conditions" (likeable, low responsibility) will be more effective than "help the world" or "help strangers at the grocery store" because vague targets are easier to blame or derogate.

Believing that luck, fate, or chance controls outcomes is associated with a sense of loss of control (Chaikin & Darley, 1973). It might be useful to frame a message that COVID is not due to chance, but is in the control of the person. For instance, a message could communicate "you can stop the pandemic by wearing a mask." As with many psychological effects, a one-size-fits-all approach might not work. For instance, asthma patients who have a high belief that God is in control were less likely to adhere to their treatment, and this was stronger for Black people than White people (Ahmedani et al., 2013). Thus, a message might have to be constructed differently depending on the population.

As for moral disengagement, there is some research on how to promote empathic engagement—or moral *engagement*. Empathic concern for others and a focus on common humanity rather than the differences of victims reduce MD (Bandura et al., 1996). Specific methods such as critical thinking interventions (Bustamante & Chaux, 2014), priming secure attachment (Chugh et al., 2014), inducing empathy, and promoting perspective taking (Bussey et al., 2015) can improve moral judgement (Risser & Eckert, 2016) and motivate people to act morally (Bussey et al., 2015). Thus, public health messages can incorporate some of these methods to reduce moral disengagement in the context of the pandemic. For example, public health messages that convey personal stories of people who have been especially negatively affected by the pandemic might induce empathy and perspective taking, and, in turn, reduce moral disengagement from adherence.

5.5. Limitations and conclusion

There are a few limitations that should prompt future study. We used a convenience sample of MTurk workers who might, for example, be more religious and educated than the U.S. population (Goodman et al., 2013). Even so, there are many studies that find that MTurk participants do not differ substantially from the general population (Buhrmester et al., 2011; Krupnikov & Levine, 2014) and are in some ways superior to other sampling methods (e.g., pay attention more; Hauser & Schwarz, 2016). In addition, our sample was predominantly White so researchers should be cautious about drawing conclusions about other groups not included in our study. Using a cross-sectional self-report survey means conclusions about causality are not justified and the impact of other methods on these results is unknown. In addition, our data were collected early in the pandemic before COVID-19 fatigue (Morgul et al., 2021). Whether these relationships hold during an extended pandemic is not known.

We did not measure other factors that could be important for adherence. For example, we did not measure media consumption, psychological reactance, or empathy. Media, especially news sources, (Simonov et al., 2020) and psychological reactance (the feeling that

one's freedom is being threatened; Brehm, 1972) likely influence willingness to follow guidelines (Bhanot, 2020). Empathy is negatively related to moral disengagement (Detert et al., 2008; Moore et al., 2012) and thus also could relate to adherence. We also were not able to test alternate models of how these relationships influence adherence with our existing sample. For example, moral disengagement can act as a mediator between personality factors and social distancing (Alessandri et al., 2020). We also did not examine differences in adherence for respondents who live in areas with governmental mandates to follow containment guidelines with respondents in areas with just voluntary recommendations to practice these behaviors. Finally, due to item nonresponse, we had missing cases for our hierarchical regression analysis, although the data were missing at random.

In conclusion, we investigated the associations between individual difference variables on beliefs about the COVID-19 pandemic and adherence to public health guidelines. The pandemic allowed for a real-world study of these social psychological variables during a global health crisis and our findings reinforce the value of social psychological theory to inform public health as moral disengagement, locus of control, and belief in a just world are related to one's beliefs about the pandemic. Moreover, even in the face of strong situational requirements including mandates in some cases to practice specific, potentially life-saving behaviors during a pandemic, these individual differences are associated with adherence.

CRediT authorship contribution statement

Paul G. Devereux: Formal analysis, Writing – original draft, Writing – review & editing. **Monica K. Miller:** Conceptualization, Methodology, Writing – review & editing. **Jacqueline M. Kirshenbaum:** Conceptualization, Methodology, Writing – review & editing.

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